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ABSTRACT

Concepts and supporting data pertaining to major health problems facing youth today as well as those anticipated in the next decade are enumerated in this resource. The material is designed as a reference for curriculum planners and classroom teachers in developing curriculum and teaching guides, units and instruction, and other curriculum materials at the state and local levels for elementary and secondary schools. Format of the book allows for concepts to be listed in boldface type in the margin with the supporting data beside them. Subject areas cover: accident prevention, aging, alcohol, disaster preparedness, disease and disease control, economics of health care, environmental conditions (water supplies and pollution control, food protection, occupational health, air pollution), evaluation of health information, family health, international health, mental health, ionizing radiation, nutrition, and smoking. A short presentation is made on how this conceptual approach can be used as a stimulus to action. (BL)

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HEALTH CONCEPTS

guides for
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**HEALTH
CONCEPTS**
guides for
health
instruction

Concepts and supporting data
pertaining to major health
problems facing youth today

American Association for Health,
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INTRODUCTION

Health education curriculums need to be continuously reviewed and brought up to date in light of changing health problems and conditions. There is a decreasing incidence of many communicable diseases and an increasing incidence of the chronic diseases. Yet the communicable diseases remain a constant threat. As earlier problems are brought under control, new environmental hazards can endanger us. The multiplying and mobile population, living longer under increasingly mechanized and urbanized conditions, create many new and pressing health problems. The solution of many of these problems requires both group and individual action. It is with selected problems—some old, others new, but all pertinent to present-day living—that this publication deals.

This publication contains concepts and supporting data pertaining to some of the major health problems facing children and youth today as well as those anticipated in the next decade. It has been prepared by the members of the Curriculum Commission of the Health Education Division, American Association for Health, Physical Education, and Recreation, in consultation with individuals who are outstanding authorities in their respective fields. National organizations concerned with these problems also have assisted the members of the Commission in this work. This material is designed as a reference for curriculum workers and classroom teachers in developing curriculum and teaching guides, units of instruction, and other curriculum materials at the state and local levels for elementary and secondary schools. No attempt has been made at gradation of material.

Health education, like many other academic fields, has turned to the concept-oriented approach in curriculum planning and development. A concept refers to an idea, a stable impression, a meaning, or a

thought held by the individual. Concepts provide a needed framework for knowledge and for thinking, both necessary aspects of health education. They range from ideas about simple things to high-level abstractions.

Traditional teaching in the past has often been for memorization of facts by a passive student who then gives them back to the teacher by rote. Often these facts were unrelated to each other and to the student's personal health problems. Under the concept approach, the student arrives at his own health concepts through an active thinking process. The concepts become internalized, hence they are meaningful.

The basic concepts and the mental experiences necessary to grasp and use them constitute the threads of the curriculum. Since a concept is an internal possession of an individual, it must be derived from the individual's experience. The supporting outlines indicate the subject matter from which the concepts are derived; they provide the content which may lead the student to an understanding of the concepts. Also, they may suggest other concepts for students and teachers. The outlines contain up-to-date factual material often not readily available from one source.

It is hoped that this reference will aid in improving both the content and methods in health teaching as the student is helped to form his own concepts through the use of this material. The topics dealt with are by no means all-inclusive. Perhaps they will challenge teachers and others to develop concepts and outlines on other topics.

The Commission wishes to express its deep appreciation to all those who so willingly gave of their time and experience to assist with this work. Our sincere thanks go to the consultants and organizations listed in the Appendix.

I

IDENTIFICATION AND FORMULATION OF HEALTH CONCEPTS

The Commission on Curriculum Development was appointed in 1959 by the vice-president of the Health Education Division of the American Association for Health, Physical Education, and Recreation. It was charged with the responsibility of setting up a plan of action for improving health education in our public schools. Its expressed purpose was to aid curriculum groups and the individual teacher at the state and local levels in developing their curriculums. As members met at conventions, they became interested in exploring the idea of a concept approach to health education. Lack of funds prevented their meeting to develop this approach until an anonymous donor, an Ohio physician, made the initial meeting for this expressed purpose possible. This physician had learned about the Commission's work through a speech by Wallace Ann Wesley and through follow-up discussions with William H. Creswell, Jr. His gift made it possible for the Commission to meet in Chicago at the American Medical Association headquarters on September 21, 22, and 23, 1962. Subsequently, the AAHPER Board appropriated funds for holding one meeting of the Commission each year. Other meetings of the Commission were held at both American Association for Health, Physical Education, and Recreation and American Public Health Association conventions.

In setting its course at the first meeting, the Commission sought to add new dimensions to curriculum materials already available. *Health Education* by the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association was cited for its value in assisting administrators, curriculum directors, and teachers concerned with curriculum development in health education in the schools. However, the Com-

mission members recognized that if health teaching was to be revitalized, a more modern approach had to be undertaken and new materials prepared. The decision was made to use the concept approach.

This approach included:

1. The identification of the crucial health problems of the 1960's and 1970's;
2. The consideration of these problems as they relate to health education instructional areas;
3. The identification of health concepts pertaining to these problems or areas by well known and recognized authorities—research and program specialists in each field; and
4. The presentation to the schools of the resulting curriculum materials leading to the concepts.

Of course, it was the hope of the Commission that such materials would assist in educating our population so that pertinent health information would be carried to positive action.

Identifying the Crucial Health Problems. The Commission acting as a "Committee of the Whole" spent the majority of the three days in Chicago deliberating, discussing, and then identifying the crucial health problems of the 1960's and 1970's. The following problems met the "crucial" criterion: Accidents; hazardous environmental conditions, such as water, air, chemicals, and radiation; inadequate teenage diets; obesity; mental and emotional problems; sexual experimentation, early marriages, early parenthood, illegitimacy, abortions, changing role of men and women; smoking; quackery; need for comprehensive medical care; lack of fluoridation; periodontal diseases; venereal diseases; chronic and degenerative diseases and disorders; aging; exploding population problems; need for disaster preparedness; and better understanding of international health problems.

Reaffirmation of the Significance of the Health Problems of the 1960's and 1970's. Following the Chicago 1962 meeting, a check list was developed listing the identified problems. Since the project had to be held to a workable form, the initial problems were reassessed, with the members rating each problem as "most significant," "significant," or "insignificant." Also, they were requested to signify whether or not the problem was so important that it "must be" in-

cluded in a modern health instructional program. A final list of problems was obtained by this procedure.

Some of the problems originally identified were combined so as to represent an area. For example, the problems of sexual experimentation, early marriages, early parenthood, illegitimacy, abortions, and the changing role of men and women were considered to fall within the area of Family Health. After the problems or areas were clearly phrased, the Commission members accepted responsibility for formulating concepts, the big ideas, relating to each one.

Selecting the Sources for Concepts. One of the major tasks confronting each Commission member was to obtain the concepts which authorities believed should be known and understood by a "health-educated person." The charge to the members was to ascertain from the experts what concepts they thought a student should possess after he has progressed through twelve grades of school.

Two kinds of authorities were sought. One was the research expert in the field who possessed the latest scientific information about the problem or area. A second type was the program expert. This was considered a person who was responsible for developing and promoting programs in the area. As a result of his work, such a person also would be most knowledgeable in the area. He should readily know what were the big ideas, and he should be able to suggest what an educated student should know and understand.

It was agreed by the members of the Commission that each authority should be interviewed, if at all possible. If it was impossible to personally discuss the plan with the expert, then the member might present his case in writing.

The Commission members assisted each other by suggesting names of specialists who might be visited. Also, a sample letter was prepared which could be sent out to those authorities who would not be able to be reached through a personal interview. Each member was to try his best to brief the specialist on the purpose of the project in order that the concepts would be identified clearly. In general, the members were successful in obtaining their goals.

Formulating and Refining the Concepts. In some cases the form of the concepts gained from the experts needed to be shortened, reworded, and refined. It was

most important that the ideas portrayed concepts rather than facts. The Commission met at three different times to edit the concepts received from the experts. To illustrate, it was common to have a process concept expressed rather than one that pertained specifically to content. Gradually, members of the Commission became skilled in formulating concepts so they were stated simply and concisely, and yet clearly described the major idea relating to the problem. The process involved in critically reviewing each member's presentation of concepts added much to the final formulation and the refinement of the concepts.

Preparation of Concepts into Usable Curriculum Form. The Commission agreed upon a format for the preparation of the curriculum materials. It was decided that the materials should consist of the following:

1. A justification of each problem, including a statement indicating its significance to children and youth;
2. A listing of the related concepts, followed by an outline of supporting data leading to the concept;
3. A presentation of the sources from which the concepts were obtained.

In designing the format for this book, we decided to list the concepts in boldface type in the margin, with the supporting data pertaining to the concepts beside them.

In some cases, it was necessary to refer to a few written authoritative references. However, it was agreed that the best sources of information were the authorities themselves. The concept material as developed using the form outlined above made it possible to readily adapt and organize the material into this book, in a form that would be usable by school personnel in curriculum planning and teaching and in the school-community health education program.



CONCEPTS AND SUPPORTING DATA RELATING TO PROBLEM AREAS

ACCIDENT PREVENTION

Accidents are the leading cause of deaths among all persons aged 1 to 36. For youths aged 15 to 24 years, accidents claim more lives than all other causes combined. Five out of six accident victims in the group are males.

In terms of cost, of lives shortened, of lost skills and earning power, of property damage, and of wasted resources, accidents are a greater problem than the most serious disease. While accidents cannot be eliminated entirely, human nature can be modified enough and environment improved sufficiently to greatly reduce the numbers of accidental deaths and injuries.

Accidents are not fortuitous but are caused. They are caused by what people do or don't do in a particular environment.

Accidents are the result of a combination of many circumstances.

Research by accident prevention authorities has produced significant findings.

Understanding of accident prevention must utilize disciplines such as psychology, sociology, medicine, engineering, economics, and statistics.

All variables in the environment must be carefully studied.

Parents and teachers should ensure that each stage of a child's physical and mental development is accompanied by appropriate knowledge of accident prevention.

Community education in safe practices should be pursued constantly in a variety of ways and through many individuals, groups, and organizations, voluntary and official.

Almost all accidents can be prevented.

In order to prevent accidents, we must understand them; through understanding we can determine how to control them.

A reduction in accidents will be achieved when everyone accepts more responsibility for accident prevention, and when better environmental controls are instituted.

Safety requires alertness to what one is doing and to the environment.

Safe living must relate to the changing environment.

Hazards should be eliminated when facilities for work, living, learning, and recreation are in the planning stage, if possible.

Regular inspection and care of equipment will help reduce accidents.

Adequate supervision is an important factor in accident prevention.

Behavior contributing to accidents may be a result of imitation, failure to follow directions, carelessness, and inability to recognize hazards.

Among human characteristics which are significant in the control of accidents are education, skill development, personal adaptability, and physical and mental health.

Multiple changes in housing, motor vehicles, recreational activities, and other environmental conditions demand continual re-evaluation of safety practices.

There is need for knowledge of the proper use and care of chemical household and garden products and mechanical appliances.

AGING

Aging is a phenomenon which begins with life and is ordinarily accelerated with maturity. Furthermore, "old age is the heritage of each of us, if we live long enough." There is increasing evidence of the relationship between practices of early years and health of later years.

Contrary to popular opinion, the health problems of the aged do not appear to be special problems of this age group. Rather, as pointed out by the American Medical Association Committee on Aging, the aged have the same diseases as other population groups, and the so-called problems of the aging are the result of a combination of causes. These causes may include the passage of time, but they also include environmental forces acting on the organism which had its foundation in hereditary factors. Except where the passage of time is the determining factor (which is rarely the case), successful modification of the deleterious environmental factors can result in the conservation of health and the further reduction of the incidence of disease in the aged.

Individual differences in the aging process make chronological age an inadequate measure of an individual's age. Rate of aging is a matter determined by each individual.

Various organs of the body as well as different capacities of the individual age at different rates.

While the influences of heredity remain relatively unexplored, we do know that some of the environmental influences on aging are climate, occupation, diet, recreation, rest, and influences of other people.

Education during the early years in nutrition, proper exercise, mental health, prevention of disease, disabling conditions, accident prevention, and use of health services can make the later years more satisfying.

Some areas needing special consideration for the aged are:

- medical supervision and counsel (at least annually)
- maintenance of adequate nutrition
- avoiding accidents (including architectural considerations)
- activity appropriate to age
- recreation
- participation in community affairs
- continued growth in knowledge and experience
- sense of pride in endeavors
- companionship
- sense of humor
- control of emotions.

Older aging people must adjust to such changing conditions as:

- departure of children
- decreased earning power
- limited mobility
- loss of spouse and friends
- less physical strength, stamina, and resiliency
- chronic ailments
- impaired hearing and sight
- loss of youthful appearance.

Education for appropriate use of services and facilities important in the conservation of health must begin in early youth and continue throughout life to ensure successful aging.

Medically speaking, aging is the change which occurs in the cells and organs as life progresses.

Increased longevity enjoyed by many has been due, in part, to application of medical research, improved health services, and a general higher standard of living.

The needs of the aged vary from the needs of all people in intensity and degree rather than in basic nature.

Successful aging can come about only through advance preparations.

With emphasis on the service motive, there must be provision for the continued use of all the capacities of the aged, including gradual retirement when possible.

Realization of some of the problems and the rewards of aging will provide a partial basis for successful aging.

Conservation of health, including mental and physical capacities, begins in early life and must be based on an understanding of factors which influence health and fitness and the motivation to conserve one's natural endowment of health.

Early development of recreational, avocational, and educational interests is important in order to lay the foundation for happy and meaningful years of leisure.

The economic, social, and political influence of the aged should be recognized and their wealth of talents, skills, and abilities used in cooperative community efforts.

Service rendered, either through one's job or voluntary actions, gives dignity and usefulness to life and thus precludes the "life is over" complex.

The service motive is essential both to the success of a democratic society and to the well-being of the individual. An individual who thinks only of himself soon feels useless, and tends to lose the desire to live.

The greatest hazard of aging is the disuse of faculties after retirement. The soft life soon leads to loss of capacities, loss of interest, and general deterioration of mental and physical health and fitness.

ALCOHOL

The abuse of the use of alcohol has created one of the four most serious public health problems of today. Education can be a major force in the solution of the problem. Attitudes and practices regarding the consumption of alcoholic beverages are so divergent as to cause controversy on the inclusion of the study of alcohol in the curriculum.

A wide variety of practices exists in the use of alcohol, ranging from total abstinence to drinking in excess. Although there are wide differences of opinion regarding the use of alcohol, there seems to be general acceptance and support of moderation. Each individual must make his own choice regarding the use of alco-

holic beverages. Regardless of the attitude of the teacher, the school has the responsibility of helping the student secure accurate information as a basis for making his own decisions. This responsibility involves the dual role of identifying the facts regarding alcohol and developing the skills of reasoning and judgment essential to wise decisions and intelligent self-direction.

Alcohol derived from sources other than fruits or grains is poisonous.

Fermentation of grains produces an alcohol content of from 3 percent to 9 percent.

Fermentation of fruits produces an alcohol content of from 10 percent to 23 percent.

Any apparent stimulation is the result of a misinterpretation due to the anesthetic inhibition-releasing effects of alcohol.

The degree of anesthesia is in direct relationship to the concentration of alcohol in the blood and other fluids of the body.

The concentration of alcohol in the blood is commonly called the percent blood level.

The individual will make his decision on the basis of his own past experiences, his knowledge of the effects of alcohol, and the mores of his family and other close associates.

The stresses, frustrations, and anxieties of present times seem to contribute to the use of alcohol for its tranquilizing effects and, consequently, as an escape mechanism.

Social pressures based on the urge to be one of the crowd are sometimes brought to bear on those who do not readily join the crowd in drinking.

A number of factors influence the percent blood level of alcohol, among which are:

- amount ingested
- rate of drinking
- volume of blood.

The drinker should always govern the amount he drinks according to his responsibilities, or the job to be done.

The legal level for "under the influence" is commonly the .10 or the .15 percent blood level. The trend is toward wider acceptance of the .10 percent level.

Beverage alcohol (ethyl alcohol) is the product of the fermentation of grains and fruits.

Alcohol is a depressant, or anesthetic, not a stimulant.

The mature individual will make his own decisions regarding drinking.

The intoxicating effects of alcohol are in direct relationship to the concentration of the alcohol in the blood.

In societies where social drinking is acceptable, the use of alcohol should be in relation to the responsibilities of the user.

Intoxication and alcoholism are not synonymous.

Alcoholism and intoxication must be considered community problems, the solution of which requires an informed and conscientious citizenry.

Alcoholism is now recognized as an illness which can be successfully treated.

State laws regarding the use of alcohol (when driving, by minors, etc.) have their foundations in the experiences of society and are worthy of being respected.

Intoxication is dependent upon the percent blood level of alcohol.

Alcoholism is related to the ability of a person to control his drinking.

When a person is unable to control his drinking, or is impelled to drink, he is classed as an alcoholic.

People who sometimes get drunk are not alcoholics.

The economic, social, and physical costs of alcoholism (and intoxication) to community, state, and nation are so great as to be a special concern of all citizens. Both public and private sources are available for treatment.

About one in 13 drinkers becomes an alcoholic.

The recovered alcoholic has no tolerance for alcohol; he can live successfully as long as he does not try to drink.

All states have set minimum age levels for the purchase (or sale) of alcoholic beverages. There are several reasons why this is a reasonable position:

- Whereas many adults will have established reaction patterns (strong habits) which will help control their behavior, even when partially drunk, younger people more often have to make their decisions regarding their behavior on the basis of conscious reasoning and judgment, both of which are impaired by even low concentrations of alcohol in the blood.
- Early and continued exposure to alcohol as a beverage has been found to be related to the development of alcoholism.
- The use of escape mechanisms that may be habit-forming should be discouraged.

DISASTER PREPAREDNESS

Disaster comes in many forms, such as fires, floods, earthquakes, transportation wrecks, explosions, epidemics, hurricanes, tornadoes, blizzards, lightning, and nuclear attack. Preparedness is advance planning and organized action designed to help people survive disasters. It is important that persons acquire the needed survival skills and understandings.

Schools are particularly vulnerable to disaster, and no school is or can be wholly immune to it. State and local authorities need to plan for these unpredictable occurrences. Each year the lives of thousands of children are saved because of effective disaster preparedness programs, while other lives are needlessly lost because disaster warnings were disregarded. Much confusion has arisen as a result of uncertainty and conflicting information relating to the safety of school children in the event of disaster.

Disaster preparedness is a necessary and a realistic alternative to fear or resignation.

It is based on the principle of self-protection extended to include groups and communities.

Civil defense is planning for coordinated use of existing governmental services and community resources in periods of emergency.

Such groups as the National Guard, Public Health Service, the American National Red Cross, the Office of Emergency Planning, the Office of Civil Defense, state and local health departments, medical societies, hospital councils, and citizen volunteers work together to prevent epidemics, to feed the hungry, to provide temporary shelter, and to take other necessary steps to reduce loss of lives.

Survival often depends upon personal first aid knowledge and skill, which can be learned through local groups such as American National Red Cross chapters.

Defense against disaster—preplanning, coordinated action in an emergency—aims directly and immediately at the preservation of life.

Survival of the individual depends upon the establishment and coordination of adequate local and national programs of disaster protection and civil defense.

**Disaster preparedness is
a strong force for
safety and peace.**

The key element in civil defense planning for a nuclear age is the provision of shelters to protect people from radioactive fallout.

Civil defense is an ongoing school and community activity and is part of an evolving American tradition.

Civil defense skills have a lasting value in peacetime and are our best protection against natural disasters.

DISEASE AND DISEASE CONTROL

Much of the tragedy of needless deaths and avoidable human suffering can be attributed to failure to take appropriate preventive action. While the communicable diseases are less of a public health threat than in years past, they still exact their toll and demand that individuals and society take appropriate protective steps. But even with the chronic diseases much can be done. Thus, the President's Commission on Heart Disease, Cancer and Stroke has noted that even these leading killers and maimers can be sharply reduced. Scientific progress in the past decade has brought some forms of heart disease within our powers of correction. Advances in surgery make it possible to save lives that would have been doomed five years ago. Rheumatic heart disease now can be virtually eliminated. Many strokes can be foreseen and prevented. Some forms of cancer can be brought almost to the changing point, and chances are greatly improved for cure of cancer in other accessible sites for over 70 percent of all cancer patients. Meanwhile, new knowledge of the fundamental processes of life promise great new weapons for the immediate future. New methods of disease detection and treatment are developing almost daily. Successful replacement of defective organs comes closer to reality every day. Essential to continued progress against the disease enemies of mankind is a health-educated public. The schools have much to contribute to developing youth who are sensitive to disease control problems, knowledgeable about pertinent facts and principles, and who assume responsibility for taking the right actions for themselves, their families, and their communities.

Disease

Disease is a physiological or psychological disequilibrium state leading to cellular or organism discomfort, disability, or death.

Each day every individual produces one or more abnormal cells which customarily are destroyed by the body. When the destructive processes fail to function, a disequilibrium between normal and abnormal cell populations results. This is cancer.

Billions of bacteria normally grow in the intestinal lumen each day. Because they grow in an open channel, they are unable to develop the force needed to breach normal defenses in the intestinal wall. When the lumen of the appendix, for example, is obstructed, bacterial growth occurs in a closed space and a disequilibrium is established favoring the penetration of bacteria into the intestinal wall. This is appendicitis.

Every individual risks bleeding from trauma experienced during life. Normally, the extent of bleeding is negligible because blood clots. When there is a decrease in factors which produce clotting, a person may bleed to death even though the trauma be trivial. This is the case in hemophilia—a decrease in protective factors.

Certain components of sunlight have the ability to induce skin cancer; the body's normal defenses essentially completely compensate for this under average conditions of exposure. When the exposure to sunlight is increased, as in the case of sailors, the same amount of defense may be inadequate. This is the case in many cancers—an increase in promotion factors.

Heredity influences disease development through altering an organism's structure or function. The red blood cells of certain African natives and their descendants tend to form into bizarre shapes which impede blood flow and may lead to early death. When seen in this country, this genetically-induced trait operates only to establish a disease state called sickle-cell anemia. In areas where malaria is prevalent, however, this same trait is simultaneously a disease-retarding factor inhibiting the development of malaria. Heredity, thus, may facilitate or retard disease.

The environment may significantly facilitate or retard disease development. Drinking water containing

Everyone has the potential for disease at all times.

While disease processes are inevitable in all of us, the undesirable effects are not always inevitable.

Because disease is a disequilibrium, it results whenever there is an uncompensated increase in those factors which promote disease or a decrease in those factors which retard disease.

Virtually every element of the organism and its environment may operate to aid or retard the development of disease.

A disease may become established long before it may be detected by signs, symptoms, or laboratory examinations.

Diseases are classified by the predominant disease-promoting factor, the predominant disease-retarding factors, the disequilibrium pattern characteristic of the disease, and by many other systems. Some diseases fit into more than one classification.

controlled amounts of fluorine causes a marked decrease in dental caries. An excessive amount of fluorine in drinking water may facilitate the development of a bone disease called fluorosis.

Even habit and custom affect the establishment of a disease equilibrium. Bantu natives customarily cook in large iron pots which the natives carry next to their abdomens. This custom theoretically retards the development of iron-deficiency anemia by increasing the iron supply in consumed foodstuffs. Simultaneously, it facilitates the development of skin cancer which appears at the point where the warm, coal tar-coated pots come into contact with the abdomen.

Cigarette smoking promotes a disequilibrium that may result in cancer after a lapse of many years.

The high fat content of American diets promotes a disequilibrium in the accumulation of fat deposits (atherosclerosis) in blood vessels, which may not become apparent for 30 to 40 years of age, at which time heart attacks and strokes may result.

Bacterial diseases are so called because a bacterium is a disease-promoting factor. Tuberculosis and pneumococcal pneumonia are examples.

Communicable diseases are so called because a disease-promoting factor may be transmitted directly or indirectly from one person to another. Tuberculosis and malaria are examples.

Chronic diseases are so called because the disease disequilibrium usually takes a substantial amount of time to run its course or because the functional result of the disequilibrium is compatible with a relatively long survival. Tuberculosis and diabetes are examples of the former, cerebral palsy is an example of the latter.

(Note that tuberculosis here is appropriately classified in three ways simultaneously, as a communicable, chronic, and bacterial disease).

Disease Control

Disease control consists of decreasing those factors which promote disease disequilibrium and/or increasing those factors which retard the disequilibrium.

Mechanical defenses may prevent the introduction into the organism of disease-promoting factors.

- The skin mechanically blocks the entry of bacteria into the organism. When the skin is absent, such as after a cut or a burn, bacterial growth may result in the production of various diseases.
- Tiny hair-like projections from the cells lining the respiratory tract continuously whip surface particles out of the respiratory system. Components of cigarette smoke destroy such ciliary motion, and the resulting accumulation of particles within the bronchial tree is thought to foster the disease disequilibria of chronic bronchitis and lung cancer.

Humoral defenses may prevent an increase in disease-promoting factors within the organism.

- Protein molecules carried in the blood, called antibodies, may slow the multiplication of bacteria and/or increase the ability of certain blood cells to destroy the bacteria.

Chemical defenses may change disease-promoting factors into disease-retarding factors. Ethyl alcohol may initiate a biochemical disequilibrium leading to death. This is retarded or prevented by metabolic chemical processes located in the liver cells which convert the alcohol to less dangerous substances.

Disease-retarding factors within the body may be bolstered by immunization, which consists of introducing a substance into the body which promotes the presence of antibodies against a particular virus, bacterium, or bacterial product. Immunity may be classified by the mode of acquisition of the antibodies. In active immunity, antibodies are produced by the body after having been exposed to a virus, bacterium, or bacterial product. Such immunity may be referred to as acquired immunity if it results from an individual contracting the actual disease and spontaneously producing antibodies during the course of the disease. Passive immunity results from the introduction of preformed antibodies into the body.

Disease-promoting factors may be blocked from reaching the body. Examples are: quarantine, purification of the water supply, eradication of the breeding grounds of malarial mosquitos, disposal of body wastes so they are not ingested unchanged by humans.

The vast majority of disease control is accomplished by "natural defenses," disease-retarding factors contained within the body.

Disease control through disease prevention consists of establishing such a balance of disease-promoting—disease-retarding factors that a disequilibrium is not established. A specific preventive technique is usually selected on the basis of feasibility.

Once a disease disequilibrium is established, disease control consists of attempts to alter the course and/or result in such a way that the least damage is produced.

Although all of the promoting factors for a given disease may not be known, prevention may be accomplished by modifying factors which empirically seem to be associated with disease. Thus, John Snow prevented cholera in London long before bacteria were known simply by removing the handle of a community pump. Similar arguments are now being raised against cigarette smoking and its documented association with lung cancer and heart attacks.

Irreversible changes usually result from a disease disequilibrium regardless of whether or not an equilibrium is re-established. These changes may be virtually undetectable or may be such that severe disability results.

- It is possible to re-establish an equilibrium between disease-promoting—disease retarding factors even though the individual may be totally disabled. Thus, a stroke victim or a child once afflicted with measles encephalitis may have no active disease disequilibrium and yet may be unable to talk, walk, or care for himself.
- In some diseases, it may be possible to re-establish an equilibrium at such a point that the irreversible changes are of essentially no consequence to the individual. Thus, in most cured pneumococcal pneumonias, the only detectable irreversible bodily change may be a new capacity to produce a relatively weak antibody to the infecting type of pneumococcus.

Depending upon the particular disease disequilibrium and the state of advance of medical knowledge, medical treatment attempts to control the disease by re-establishing an equilibrium (cure), slowing the rate of progress of the disequilibrium (control), or altering the end result of the disequilibrium (palliation).

- An equilibrium may be re-established by decreasing disease-promoting factors only. This is the case in many bacterial infections when certain drugs are administered (e.g., a urinary tract infection treated with sulfa drugs). The growth of the bacteria is slowed, thus decreasing a disease-promoting factor, allowing the body's disease-retarding factors to re-establish an equilibrium.

- An equilibrium may be re-established by increasing disease-retarding factors only. This is the case in many viral infections in which bed rest is the only known therapy. The rest facilitates the action of disease-retarding factors.
- Disease control may consist of a change in the disequilibrium rate when it is not possible to re-establish an equilibrium. An example would be diabetes mellitus in which "cure" (the re-establishment of an equilibrium) is not possible. Through drug and/or diet therapy, however, the disequilibrium rate may be slowed almost to a halt.
- Finally, medical treatment may seek only to alter the end result of the disequilibrium when it is not possible to alter either the direction or the rate of the disequilibrium. This is true with respect to many minor illnesses, such as the common cold. The only efficacious therapy consists of relief of the discomfort, as the disease course cannot be altered. Similarly, relief of discomfort may be the sole goal of the therapy of certain types of cancer.

The success of disease control after the establishment of a disease disequilibrium often depends as much upon the behavior of the affected individual as upon technical advances in medical care.

- Success in disease control often depends upon early intervention in the disequilibrium. Many forms of cancer are essentially completely curable early in the course of the disequilibrium, but completely incurable later. Delay by the individual in seeking care may preclude effective control.
- Because a disequilibrium may proceed without any symptoms of readily detectable signs, a successful early intervention may depend upon an individual actively seeking personal routine medical examinations. Cervical cytological smears, blood pressure determinations, and ocular tonometry are measures which, if routinely done in the absence of any symptoms or signs, offer an excellent chance for successfully halting cervical cancer, hypertension, and glaucoma, respectively.

All efforts at disease control alter a number of equilibrium states simultaneously. In choosing among various control techniques, one must compare the potential benefit in one area with the potential damage in another, both damage and benefit resulting simultaneously from the same action.

- Similarly, successful disease control may depend upon the actions of an affected individual during the process of intervention. Thus, retarding the diabetes mellitus disequilibrium usually depends upon diet control and/or the regular administration of drugs for a period of years. The responsibility for completing such regular drug therapy can only be assumed by the individual with the disease.

Immunization procedures must balance the risk of contracting a disease from the immunization with the risk that an individual has of contracting the primary disease itself. Thus, passive immunization with tetanus antitoxin may produce death in some instances from serum sickness. Its use, therefore, is restricted to occasions when the actual risk of tetanus is quite high because of the absence of previous active immunization. Conversely, the risk in active immunization against tetanus using tetanus toxoid is so small compared to the damaging effects of the acquired disease that immunization is urged.

Antibiotic usage rests on the balance between potential damage from the antibiotic (e.g., allergy, bone marrow depression, deafness) and the potential benefit (slowing of bacterial growth or actual killing of the bacteria). It is for this reason that penicillin should not be given as a treatment for a common cold. There is considerable potential harm and no potential benefit in this instance.

Social as well as physical and mental equilibrium must be balanced in some forms of disease control, such as the reduction of lung disease-promoting factors through air pollution control. The effect of removing air pollution may be beneficial from the standpoint of lung disease prevention, but may simultaneously produce substantial unemployment through the closing of businesses that cannot afford control costs.

ECONOMICS OF HEALTH CARE

Many choices are open to an individual seeking health and medical care—the type of physician he selects, the nurse or auxiliary personnel he employs, the drug and food products he buys, the method of financing his health care, the selection of a hospital or nursing home. His health, his money, and even his life are at stake by the choices he makes!

The American people are already spending nearly \$35 billion yearly for public health, medical care, construction of health facilities, and health-related research. By 1970, expenditures for these services are expected to reach \$51.4 billion, 6.5 percent of the gross national product for that year. Funds for this enormous endeavor come basically from peoples' incomes, through tax revenues, from health insurance benefits, and from individual savings.

Young people, as prospective purchasers of health services and as future taxpayers and voters, should be provided with the kinds of information that will make them responsible citizens in relation to their own health and their health dollar. It is an important function of the school to help the student learn to make intelligent choices in an area in which families on the average spend \$300-\$400 annually, and life itself may be at stake. Prospective consumers need education so that health advertising and propaganda may be evaluated and discriminating choices made in the health and medical services needed. This area of education offers great opportunity to develop the power to think critically.

The health of the nation is a key to the economic vitality, to the morale and efficiency of its citizens, and to success in achieving the individual's goals. Expenditures for the maintenance and attainment of health are a sound investment for the economy of the nation and the individual.

Early diagnosis and treatment of a health problem is more economical than delayed care.

Expenditures for the maintenance and attainment of health are a joint investment for the economy of the individual and the nation.

Everyone should have access to medical care regardless of income.

It is more economical to prevent than to cure illness.

Health care, including medical services, is changing.

The ability to purchase health care varies with the economic condition of the individual or family.

Beyond the mere economics involved, a belief in the worth and dignity of every individual is a basic tenet of democracy.

Private consumer expenditures for health care—medical, dental, hospital care, drugs, health insurance, and appliances—amounted to \$25.2 billion in 1964. The government (federal, state, and local) spent \$7.2 billion for health services. Construction of health facilities and health related research required \$1.9 billion of tax money and \$1 billion of private funds. An additional \$1.1 billion came from philanthropic sources and from industry. About 6 cents of every dollar the public spends relates to health and medical care.

Almost \$9 billion has been estimated as the value of the average seven working days lost annually by earners due to illness. Illness and injury waste individual and national resources.

The quality of health care is greatly improved with the expansion in medical science, technological advances, the development of new and revolutionary drugs and medical procedures.

The emphasis today is on prevention, early detection, and prompt treatment of disease.

Physician visits to the home are declining; services are rendered more often in doctors' offices, clinics, or hospitals where needed equipment, personnel, and facilities are available.

Specialization is growing because medical care is becoming more complex. (Today over half of all physicians in private practice are specialists, while in the early 1930's, the ratio was one specialist to five general practitioners.)

Improved diagnostic procedures, more effective drug therapy, and early ambulation are reducing the average length of the patient's stay in the hospital. (The average length of stay was shortened from 9.1 days in 1946 to 7.7 days in 1963.)

Families with low incomes are apt to experience more illness than those with high incomes, hence they are apt to need more medical and hospital care and have less income to pay for it.

About three-fourths of the population of the United States have some form of health insurance coverage, but persons of relatively fixed and generally

low incomes—the poorly educated, the unemployed, and some elderly people—have inadequate personal protection against the rising cost of health care. Government assistance has been made available to fill this need.

Economic inequalities have a marked effect on the distribution of personnel and facilities for the treatment of illness. Some rural areas and states less favored economically fare the worst.

The Consumer Price Index (1957-59=100) shows that over-all health care (in this report called medical care services) has increased more than any other of 400 items in the Index.

Most of the increase in cost for health care is accounted for by the increasing cost of hospital care. The total expense per patient day in non-Federal short-term general hospitals rose from \$9.39 per patient day in 1946 to \$38.91 in 1963.

The costs may be borne by the individual or his family from current income; or they may have savings, carry insurance, borrow money, or use a combination of these ways to meet the costs.

There has been a marked growth in voluntary health insurance and an increasing participation by the government in health care.

Health services or money to purchase them may be donated by individuals or groups such as physicians, dentists, churches, civic clubs, and voluntary health agencies.

Health insurance applies the law of averages to the budgeting of expenditures for health care; i.e., it spreads heavy health care expenses from a few people's shoulders to a larger group and over a period of time. This is a voluntary measure of providing for emergency illness or accidents by private initiative undertaken by the individual alone or as a member of a group.

The average family can usually manage the cost of minor illnesses or injury; an extended or extensive health problem can be economically catastrophic.

The amount of health insurance a family carries should be decided upon in relation to the amount they can spend from current income and reserves to meet the cost of illness. It should be related also to possible major illness of long duration in the family.

Health care costs are increasing and must be borne by someone.

Financial planning for health care while one is well rather than when sickness strikes is a wise procedure, since illnesses and accidents are for the most part unpredictable.

The individual has the primary responsibility for his personal health.

The most economical health insurance is intelligent, healthful living based on sound, scientific information.

Choices must be made in regard to the selection of professional services, facilities, health products, and ways of meeting medical costs; wiser and more economically sound choices can be made when one is informed in regard to the kinds and uses of personnel, facilities, and products available, and has developed criteria for selecting them.

ENVIRONMENTAL CONDITIONS

Man's health and well-being are influenced greatly by the environment in which he lives. Many physical, biological, and social factors affect health and create the necessity for adjustments and controls.

Among environmental health problems which are of special concern in our increasingly complex society are those of water supplies and pollution control, food contamination, occupational hazards, air pollution, and radiation exposure. These problems have been singled out for special emphasis in this outline, not only because of their importance as a subject of study for young people but also because they are areas within which youth may play a part in measures for prevention and control.

Water means life to man.

Water Supplies and Pollution Control

Water of high quality and in adequate quantities is needed for such domestic purposes as drinking, cooking, bathing, washing clothes, household cleaning, and swimming pools, and of lesser quality for removing wastes, watering lawns and gardens, and for air conditioning. Health is directly related to such safe and adequate supplies of water.

In industry, water is used as a source of power, as a part of many industrial processes, as a vehicle for removing industrial wastes, and for numerous other uses.

Communities depend upon water for transportation and recreation.

Through support of fish, plant, and wild life, water provides food to man.

In nature, water exists in various states of chemical purity. Water vapor in the atmosphere condenses as rain or snow and in this relatively pure form replenishes the "fresh" surface and underground water, eventually rejoining the bulk of sea water.

As water moves toward the sea, it acquires a great variety of substances, organic and inorganic, in ever-changing amounts and character. Some of these impurities may be greatly reduced through dilution and self-purification as the waters flow onward toward the sea.

The causes and effects of water pollution are many:

- Body wastes are discharged through sewerage systems into lakes, rivers, and oceans without prior adequate treatment. People drinking the polluted water, swimming in it, or eating shellfish and other plant or marine life growing in the water may develop such diseases as hepatitis or typhoid fever.
- Salt water seeps into fresh water supplies near coastlines, contaminating it so that it is unusable.
- Chemicals of noxious character discharged with household wastes find their way into waterways and lakes, making water supplies taken from these sources unfit for human consumption.
- Waste products of industry are discharged into bodies of water which are used for drinking and other purposes. Many of these products are difficult to remove by treatment processes commonly used by water supply agencies.
- Discharge of human wastes into bathing waters and deposit of litter on bathing beaches have made many such areas unsafe and unattractive.

Standards of quality or purity must be maintained continuously.

When a local shortage of water exists, water must be transported from areas of plentiful supply. In some communities desalinization of brackish or sea wastes may be necessary.

In its movement on the surface or underground, water acquires impurities which sometimes result in pollution.

An adequate supply of water of satisfactory quality is seldom available for community use without pumping, purification, storage, and distribution facilities.

Used water of the community (sewage) must be collected, purified, or otherwise treated before its discharge into receiving waters and before reuse.

In many parts of the country there are shortages of water of acceptable quality for human needs. Natural and nearby sources of fresh water cannot provide all the "new" water required.

Water pollution and water uses must often be controlled through joint action at local, regional, state, national, and even international levels.

Waters cannot be allowed to accumulate, especially in warm climates and in urban areas, without a risk of incurring health hazards and nuisances.

Provision of more adequate community water supplies usually requires the provision of adequate waste and storm water drains (sewers) with appropriate purification or treatment facilities.

As population increases and standards of living improve, more water is needed for domestic activities, waste disposal, industry, agriculture, recreation, and the support of fish, plant, and wild life.

Too much of the water used is returned to lakes and streams in a polluted condition, thus restricting further immediate use.

The dilution and self-purification capacity of polluted waters can become exceeded, thus producing local shortages of water of acceptable quality.

The Federal Water Pollution Control Act of 1956 permits the federal government to join with local governments in the financing of sewage treatment facilities. Each state has a water pollution control agency through which these funds are administered. Each local community, however, must take the major responsibility for supervision of water uses in its own local area.

Municipalities are increasingly joining together through formation of local water control agencies to meet problems in congested metropolitan areas. Interstate commissions covering entire watersheds are being formed to meet problems that extend across state lines.

Research programs sponsored by the Public Health Service and other agencies are being developed cooperatively with universities, state and local authorities, and industry in order to discover and test improved methods for controlling pollution of our water supplies.

Public demand for enforcement of federal and state laws which exist to reduce water pollution will assure wider application of these laws and the maintenance of adequate standards of water purity and availability.

Conservation of water and control of water pollution rests on the shoulders of each citizen working cooperatively within his own realm of influence.

As new communities are being planned and developed, the planners are increasingly selecting sites which are favorable not only in terms of transportation and power but also in terms of adequacy of community water supplies and appropriate waste disposal equipment.

The services of the environmental health team of both state and local health departments, consisting of public health engineers, sanitarians, and specialists in water control are indispensable in these planning efforts.

Water has been and will continue to be a determining factor in the economic growth of communities.

Community water supplies and water-carried waste disposal systems are a basic consideration in all community development plans and programs, and deserve a high priority in all economic development.

Food Protection

Food poisonings or food infections may be caused by bacteria or toxins that are in the food when consumed (e.g., salmonella infections, staphylococcal poisoning, and botulism).

Other types of food poisoning can occur when poisonous substances accidentally enter foods before consumption.

Foods may serve as the medium for conveying specific infections from person to person, such as typhoid, dysentery, or streptococcal infections.

Some foods may be naturally poisonous to the human body, such as poisonous mushrooms, while others may cause allergic reactions.

Foods may contain biological or chemical substances that are deleterious to the human body and its various processes.

Production practices:

- Vegetables and fruits should be grown on soils that are as free as possible from contamination. Use of untreated human wastes or of polluted irrigation waters as fertilizers should be avoided.
- Agricultural chemicals and insecticides may contaminate food and ultimately endanger those who handle or consume it.
- Animals should be protected from infections. Unhealthy animals which may be a source of infection to man should be eliminated or treated so as to remove the danger of infection.

Safe and hygienic practices during production, preparation, storage, and preservation of food can help assure consumers of a product which is palatable and free from contamination.

- Animal by-products should not be used as animal feeds unless they have been pasteurized to destroy salmonella and other organisms.

Preparation, storage, and preservation of food:

- When handling food, a worker should follow good personal hygiene practices. He should avoid direct contact with the food especially when carrying an infection.
- Perishable foods such as dairy products and meat should be stored at a temperature of 45° F. or less until ready for use. They should be refrigerated in quantities or containers which are small enough to allow for rapid and adequate cooling.
- In home canning, as in commercial canning, foods should be canned under pressure to assure complete destruction of the disease-producing spores of the botulinus bacillus. As an added precaution, home-canned foods should also be boiled thoroughly after removal from cans and before eating.
- All milk should be pasteurized before consumption. Sanitary handling of milk from the producer to consumer is necessary.
- Food on display in stores should be covered to prevent contamination by rodents, insects, or people.

Regulations, controls, and education:

- The Federal Food and Drug Administration, the Public Health Service, the United States Department of Agriculture, the Federal Trade Commission, as well as state and local health departments are among the agencies which have established regulations or controls.
- An informed public that supports control measures and demands food which is safe and sanitary is the best assurance against food contamination.

Occupational Health

Personal causes are: unnecessary exposure to danger, lack of skill or knowledge in use of materials or equipment, fatigue, poor attitude toward work, anxieties due to financial or family problems, physically or emotionally unsuited to the occupation.

Hazardous factors in the environment are: chemical hazards such as insecticides, industrial gases and wastes, and fumes; biological hazards such as insects and farm animals.

Health problems common to many occupations include:

- Dermatoses, or skin diseases, caused by such factors as physical or chemical irritants.
- Mechanical injuries from machinery, flying objects, splinters, abrasives or sharp tools; injuries from falls and falling objects.
- Chemical poisoning, as from solvents, insecticides, and carbon monoxide.
- Physical stresses, as from lifting, pulling or pushing, and from extremes of noise, vibration, glare, heat, cold, or radiation.
- Emotional stresses caused by such factors as fatigue, long hours, disagreeable working conditions, and anxieties over personal or family problems not related to the occupation itself.

Some occupations are associated with specific stresses or diseases, such as silicosis in mining, tuberculosis in physicians and nurses, bends in skin diving or deep-sea diving, injury from animals in farming, and psychological stresses in airport control rooms.

When an accident or illness occurs, it should be studied to determine the factors that lead to the condition and the relative importance of each.

Employer responsibilities vary widely from industry to industry, as well as from community to community. They include:

- Eliminating hazards, such as substituting harmless materials for harmful ones and producing a safe and healthful environment.
- Controlling potential hazards by providing protective devices on machinery and exhaust systems for removal of dusts, fumes, gases, and vapors.

Many factors, working individually or together, create conditions in man's occupational environment which, if uncontrolled, can endanger his health and safety.

Some health problems are common to many occupations; other health problems vary with the specific occupation.

Measures can be designed and applied to prevent or minimize occupational hazards.

- Employing industrial physicians, nurses, safety engineers, and other personnel to carry on extensive programs of education and control for the protection of workers.
- Following personnel practices which place each worker in tasks for which he is physically and emotionally suited.
- Providing adequate insurance programs.
- Being familiar with the governmental regulations applicable to their specific industries.

Employees share the responsibility for prevention and control of occupational risks by:

- Becoming aware of the potential hazards in a work situation and of the efforts of their employer and fellow employees to prevent and control factors causing the hazards.
- Maintaining optimum health so as to be as physically and mentally fit as possible for the particular tasks they will perform.
- Learning how to act to prevent unnecessary occupational illnesses or accidents and applying this knowledge in daily practice.
- Familiarizing themselves with governmental regulations which define employer and employee responsibilities, workmen's compensation provisions, health insurance, and other related controls, and acting in accordance with these measures.

Government responsibilities for occupational hazards include:

- Establishing regulations and laws for the prevention and control of occupational hazards.
- Establishing occupational health programs at local, state, regional, and national levels to include (1) research into the multiple factors influencing man's occupational environment; (2) service to industry in their efforts to solve occupational health problems; and (3) education of employers, employees, and the public at large regarding the whole field of occupational health.

Air Pollution

The major causes of air pollution are:

- Burning of fuels for heat and power in automobiles, power plants, home and industrial furnaces.
- Burning of refuse, leaves, and other wastes; forest fires; grass fires.
- Public works activities, such as road building and street sweeping.
- Construction projects as new buildings, razing old buildings, etc.
- Natural occurrences such as dust storms, spreading of pollen from certain weeds, grasses, and flowers.
- Use or production of chemicals, radioactive materials, and abrasive dusts as a part of certain industrial processes.

Direct effects: May cause or help to cause bronchitis, lung cancer, emphysema, and other pulmonary diseases; may cause asthma or make it more severe; may affect or complicate cardiac insufficiencies; may aggravate emotional health problems through its depressing effects.

Indirect effects: May kill plant-life or affect its growth rate and fertility; may reduce the amount of sunlight reaching the earth, sometimes by as much as one-half; may reduce the amount of oxygen available for life processes; may affect the health of animals necessary for human existence.

In homes, fuel appliances using gas, oil, or coal should be maintained and operated in ways that will prevent the accumulation of dangerous pollutants in home and community atmospheres. Approved incinerators should be used for disposal of refuse and other wastes. Care should be used in handling of cleaning fluids and other fume-producing materials.

In industry, the best possible devices should be used for operation and maintenance of equipment so as to hold pollution to a minimum. To illustrate, there should be adequate and consistent use of ventilating devices in work involving automobile engines. Employees should follow the special instructions given them to protect themselves from hazards found on the job.

Air may become polluted by certain materials and gases such as dusts, smoke, and vapors. Most air pollutants are a nuisance problem and cause property damage, but some may affect health.

The effects of air pollutants on health are both direct and indirect. Much yet must be learned about the relationship between air pollution and health.

With man's present knowledge, greater control of air pollution could be exercised in homes, in industry, and in the community at large.

Air pollution control programs require community cooperation based on public understanding and support.

In the community, public works should be operated with the same attention to pollutant control as are applied in home and industry.

Citizen groups can promote and support community efforts to find solutions for local problems.

New laws may be needed to regulate human activity in home, industry, and community at large so as to prevent or minimize pollution problems.

Individuals and groups need to be correctly informed of factors causing air pollutant problems and encouraged to take the necessary steps to control conditions affecting pollution. Community-wide programs of education and control contribute to this end.

Radiation exposure has been a factor in the environment as long as man has lived.

IONIZING RADIATION

Cosmic rays from outer space and radiations from radioactive materials existing naturally in the earth have had their effects in somewhat unnoticed ways.

The knowledge that built the atom bomb has made available hundreds of artificially-produced radioactive materials or radioisotopes. Radiation from these radioisotopes has the quality of ionization and hence is referred to as ionizing radiation.

When ionizing radiations pass through matter, they affect the structure of the matter. Damage may result.

Ionizing radiations passing through matter have the ability to strip electrons from the various atoms of the material in which they come in contact, affecting the structure of the material. Damage to both man and materials results from this interaction with the atom.

The ionizing radiations from radioisotopes are referred to as alpha particles, beta particles, and gamma rays.

- Alpha particles cannot penetrate the surface layers of skin. They are only a health hazard if the emitter of these rays gains entrance into the body through inhalation, ingestion, or breaks in the skin.
- Beta particles are more penetrating and can cause skin burns, but also are more hazardous if they originate from a source which has entered the body.
- Gamma and X-rays can penetrate the body if one does not protect himself with some

form of shielding to stop the radiation. Gamma rays are also hazardous if the emitter of the rays gains entrance to the body.

There are levels of radiation which one may receive with no apparent harmful effect; there are other levels which can cause injury and even death.

- Ionizing radiation will alter body cells, and some of the cells or even the organism itself may die.
- Within limits, the human body has the ability to repair damage, except for damage to the reproductive cells.
- Radiation effects on reproductive cells are cumulative. The damage will not be seen in the one who receives the radiation, but can result in mutations occurring in later generations.

Permissible levels of radiation exposure, which can serve as a guide for the safe use of these radiation emitters, have been established from years of research.

Radiation protection programs are in operation where such equipment and materials are used in quantity. One must be aware of the potential hazard, use proper equipment, apply good judgment, and follow recommended procedures for handling these materials.

State and federal agencies, including the Atomic Energy Commission, have established regulations governing the safe shipment, storage, use, and disposal of these materials.

X-ray equipment and radioactive materials when used with proper controls can be very beneficial to man as tools in research, diagnosis, and therapy.

With caution, one may work safely with radioactive materials and with equipment which produces ionizing radiation.

EVALUATION OF HEALTH INFORMATION

It has been estimated that consumers spend millions of dollars annually on falsely promoted, worthless, and sometimes dangerous services, products, and machines. More tragic than the financial loss is the suffering and in some cases, the deaths due to the lack of competent medical attention; the destroying of confidence in authentic agencies, services, and products; the spread of health misinformation; and the misspending of family funds.

Quacks today are frequently hard to recognize. They may be educated, well-dressed persons skilled in sympathetic concern and in promoting false solutions to health problems. At times there are individuals who honestly believe in a worthless product or cure and promote it with missionary-like zeal. Some persons operate outside the realm of human decency and honesty. Members of all groups of people—rich, poor, educated, uneducated, young and old—are victimized. The need to assist persons in making wise judgments and to detect deceiving promotions is one of the current health problems.

Since the two greatest deterrents to quackery are well-enforced laws and an enlightened public, the role of the school in consumer education is an important one. In order for an individual to make wise choices, he must have reliable information and a willingness to apply it. Basic in all education are the availability of reliable information, the opportunity to develop desirable attitudes, and the skill of critical thinking. This becomes a great defense against the practice of quackery.

Self-diagnosis and self-medication are often wasteful and at times harmful.

Self-medication often causes individuals to delay or neglect seeking needed competent medical attention. This practice can result in added suffering and, in some instances, death.

The money spent on worthless cures and "special" foods is often needed for real family necessities, such as food, clothing, and shelter.

In some cases, the habit of taking unneeded remedies can impair health.

Self-prescribed special diets may actually create or contribute to dietary deficiencies. Scientific evidence does not support the popular false premise that modern foods are nutritionally inadequate. A balanced diet selected from the foods commonly available will provide all of the nutrients needed by the body.

Some unethical individuals and groups extort money from the public by pretending to medical skills, by promoting cure-alls and gadgets, and by spreading health misinformation.

The health fraud, who is interested in money only, uses many different approaches in fooling the public.

The health fraud offers "miraculous" cures, gadgets, and products. He capitalizes on people's unrealistic desires to find a quick, easy, and painless solution of their problems.

The practice of deliberate misdiagnosis of a disease in order to effect a cure for a disease for

which no cure is known is a common trick of a charlatan.

Contrary to popular opinion, the health fraud's projects are expensive. They are tailored to the purse of the victim and often to a continuous income over a prolonged period of time.

All products promoted by quacks are not harmful. It is the extravagant claims of the unrealistic benefits of these products that are often false.

The fraud plays the role of a martyr by claiming harassment from established medical authorities and governmental agencies.

Quacks do exist in the scientific community. However, if an individual belongs to an established professional group, there is a greater probability that he is ethical.

Sincere individuals often misinterpret a recovery, such as a spontaneous remission, as due to a special situation or product. Since they believe that this is the truth, they promote it to others.

Some persons with a little extra knowledge and training do not recognize their limitations. They confidently advise even though they are often in serious error.

Basic in education for detecting quackery is the availability of reliable knowledge. A planned sequential health education curriculum in the schools is one of the most reliable ways to offer all persons the opportunity to secure reliable health information.

Skills of critical thinking in the areas of health information, services, and advertising are essential defenses against health frauds.

The citizen should develop the habit of exercising a skeptical attitude toward all health-related advertising and lectures.

In addition to an individual's awareness of his need for reliable information and realistic attitudes in making personal choices related to health practices, he should also be aware of the seriousness of being accurate if he chooses to advise another person in matters of health.

The public needs to understand that an individual who is well-qualified in one area in the field of health is not necessarily an expert in other health areas.

Some well-meaning but misinformed persons with a desire to help people who are ill promote false cures directly to the general public.

An informed, thinking public is important in controlling medical quackery, misinformation, and fraudulent practices.

Society has legal safeguards against quackery and fraudulent practices.

Professional groups, government sources, and the Better Business Bureau are the best authorities to consult for reliable information on nutrition, health products, and health services.

Laws such as the Federal Food, Drug, and Cosmetic Act are for the purpose of protecting the public against dangerous products and fraudulent practices.

The Food and Drug Administration, the Federal Trade Commission, the Post Office Department, and counterparts of some of these exist at district, state, and local levels to control and regulate the advertising and sale of fraudulent products and devices.

Most states have laws related to fraud and have their own investigative and enforcement agencies.

No law compels authors of books or printed matter to be scientifically accurate. The constitutional guarantee of freedom of the press permits wide leeway in the publication of all printed material.

Citizen and professional cooperation is a necessary defense against quackery and fraud. Reporting suspected fraudulent practices and products, participating as a witness when requested, and supporting enforcement and educational programs by sufficient money and needed personnel are ways of assuring better protection against quackery.

The American Medical Association's Department of Investigation maintains a file of information on persons who prey on the public through various forms of quackery. They are willing to share this information under the proper circumstances. In addition, specific councils and departments have special interests in the area of quackery and they prepare and distribute health materials appropriate for the public.

Voluntary agencies such as the National Health Council, the American Cancer Society, and the Arthritis Foundation have sponsored programs, spearheaded legislation, and carried on investigations, and promote a vast program to educate the public.

The National Better Business Bureau issues information bulletins to its members, brings to the attention of enforcement agencies suspect processes and practices, and releases information on a variety of subjects including those related to quackery to the communications media.

Other professional organizations contributing to defense against quackery are the American Dietetic Association and the American Dental Association.

The state and local departments of health are a reliable source of information about products, foods, machines, and health services.

FAMILY HEALTH

Children and youth need to understand the responsibility of family life and the role of families in the transmission and development of sound values and satisfying human relationships. Society recognizes the role of the home as the primary source of family health information. However, some parents have not adequately fulfilled their responsibilities in relation to this role, as is evidenced in the incidence of venereal diseases, promiscuity, teenage parenthood, teenage marriages and the instability of such marriages, and criminal abortions. These are symptoms of deeper problems that may in part stem from faulty concepts of home and family life.

In the United States there is a feeling among many that no institution in our society is in a better position to reach children and youth than the school. A planned program on family health is an essential instructional area in the modern curriculum and has been rated as an area of greatest interest by students who have participated in national studies of health interests. Provision for progressively planned family health instruction would contribute immeasurably to the education of young people and thus to the prevention and alleviation of some of the most serious social problems of youth today.

The relationship among family members determines the quality of family living.

The individuality of each member of the family must be recognized and preserved.

The family guides individual members so that each demonstrates the ability to understand, respect, and accept himself and others.

The family, as the basic unit of our society, has primary responsibility for helping children to develop values, including self-discipline.

Moral and spiritual values prevailing in the family group help to shape present and future family relationships and serve as a basis for decision-making.

Parents need to help children and youth to

Good family life assists in meeting the needs of family members.

Early conditioning of individual values, religious beliefs, and respect for social mores and laws serve as a basis for conduct during courtship and marriage.

In our culture, dating, going steady, and engagement are significant phases in the selection of a life partner.

Mature love is a major factor contributing to the choice of a life partner.

Marriage presents challenging opportunities and responsibilities to each marriage partner.

Family members experience physiological, psychological, and sociological problems and make adjustments as they progress through part or all of a family cycle.

Parenthood, a biological gift and a modifier of personality, perpetuates the life cycle.

learn why certain kinds of behavior are acceptable in developing attitudes and in building resources for inner strength and serenity.

Courtship, including dating, going steady, and engagement, is the period during which partners find out about each other.

Dating depends upon how one feels about himself, his attitude toward the opposite sex, how socially expert he is at making friends, and how well he functions in mixed groups and in intimate associations.

The engagement period is a natural outgrowth of dating and courtship experiences and provides an opportunity to predict future marital adjustments.

Health factors often influence the choice of a life partner.

A good marriage partner has a healthy self-concept. He is one who has the ability to analyze critically and constructively.

Love is primarily giving, not receiving, and is based on the realities of everyday family living.

Successful marriage depends upon choosing the right partner, and each partner making satisfactory adjustments.

Each spouse should have an opportunity for personal growth and development.

Achievement of satisfactory adjustments by both partners leads to the development of a stable and lasting marriage.

Each family grows and lives out the family cycle in its own unique way.

Health influences individual and family living throughout the family cycle.

Family living is enhanced when individuals understand and accept individual differences in patterns of growth and development.

Communication is likely to be more effective when family members use socially acceptable vocabulary concerning sex and reproductive functions.

Parenthood begins a new era of responsibilities in the role of the family.

Parents should understand the characteristics of normal child growth and development.

Good prenatal and postnatal care should be secured for mother and child.

The nature and quality of family relationships affect a child's growth and development.

Some unmarried persons adjust in a completely satisfactory manner, while others fail to make good adjustments. Persons who desire marriage, but do not find a mate are most likely to have difficulty in adjusting.

The unmarried may achieve a normal satisfaction of their affectionate needs through relationships with their family group and with friends.

The unmarried can contribute effectively to society through attention to a successful career and through community service.

Community resources serve to prevent family disorganization and to reinforce the family as the basic unit of society.

Individuals and family members should consult appropriate resources in the community when they are unable to solve their own problems.

People who do not marry make adjustments as single individuals in an adult society organized basically around family groups.

Professionally competent individuals and recognized agencies and institutions within the community are important resources for helping individuals and families solve their problems.

INTERNATIONAL HEALTH

Health is of major national and international concern. Despite spectacular advances in the medical sciences, millions of people throughout the world are afflicted with ill health and lack the vitality to progress in their strivings for a better life. Diseases still take their toll, hampering the economic and social development of nations.

Diseases are no respecters of international boundaries; in this day of rapid movement from one part of the world to another, international efforts are required for their prevention and control.

Developing countries need help in identifying those health problems demanding priority for total social and economic improvement, in establishing health services and programs, and in the training of health workers for these services and programs.

Individual countries can no longer act with complete independence in the control of disease and the improvement of health; programs need to be developed on an international scale.

International health programs are now in operation throughout the world with efforts directed toward helping nations individually or in combination with other nations toward better health of the people.

A wide diversity of government-supported programs operate on both a multilateral and bilateral basis, or a combination of the two.

- Multilateral programs—nations combine their funds and resources in support of international health agencies and programs, e.g., WHO (World Health Organization), UNICEF (United Nations Children's Fund), FAO (Food and Agriculture Organization), Unesco (United Nations Educational, Scientific, and Cultural Organization).
- Bilateral programs—one nation contracts with another to provide assistance on a mutually agreed basis. AID (Agency for International Development), United States Department of State, gives assistance in the form of advisory personnel, training grants, and support of special projects, increasingly in cooperation with international agencies. Many other countries give direct help of similar nature to developing nations throughout the world.
- Combination of multilateral and bilateral programs—resources of international agencies and those of individual countries increasingly are being coordinated around specific projects and programs which require vast outlays of funds and staff. Examples of such programs are those dealing with malaria eradication and with provision of safe and adequate water supplies.

Certain programs are supported by such sources as private foundations, universities and professional organizations. Many other small-scale international health services are sponsored by a wide variety of groups such as churches, service clubs, and local interest groups.

MENTAL HEALTH

Any consideration of current health problems must include mental health and the prevalence of mental illnesses. There are at least a hundred different kinds of mental illness, and no family, indeed no person, can escape involvement directly or indirectly to some degree or in some manner with this problem area.

In terms of magnitude, there are more than 600,000 persons in state and federal mental hospitals in the United States, but these statistics include only those with illnesses severe enough to warrant confinement. The cost of services for this group is about \$1.8 billion annually. This constitutes a significant segment of our population and a substantial financial expenditure, but falls short of telling the complete story of the incidence of mental illness.

Deviations from normal or acceptable behavior range from very mild, transitory emotional disturbances to clinically-defined, acute mental illnesses. Within this range, people attempt to cope with the problems of day-to-day living by reacting to environmental conditions in a variety of ways. In addition to those suffering from definable mental illness, countless numbers of our citizens lead lives of desperation, insecurity, and futility resulting from emotional difficulties, transient or permanent, that may not be recognized as such.

All school personnel have opportunities to contribute to the mental health of children through day-to-day experiences in many areas of instruction. The perceptive teacher recognizes and utilizes where appropriate more direct teaching-learning situations dealing with pertinent aspects of personal, family, and community life to sharpen the focus on sound mental health practices.

In all health education content areas mental health implications are present, and through a unified approach meaningful experiences can contribute to sound emotional development. While special attention to mental health as content may be appropriate at times within the framework of the health education curriculum (such as a study of the community's mental health resources) this should be looked upon as supplementary to the broader, integrated approach. The entire school experience should be so constructed as to enhance mental and emotional well-being, for it is impossible to confine this topic to a single subject area or to one teacher.

A given type of behavior may result from many determining factors, some psychological and some physiological in origin.

Behavioral segments tend to recur in ordered sequence; hence, behavior may be anticipated and, to a degree, may be predicted.

Human behavior tends to be ordered and patterned.

Behavior is complex.

Similar forms of behavior may be produced by different motivational factors. Similarly, the same motivational factor may produce different forms of behavior.

Some behavior may be motivated by factors of which the individual is aware. Other motivating factors may operate at the subconscious level.

A proper understanding of behavior should be based on an understanding of determining factors and the goals being sought, rather than labeling what is observed as good or bad.

Behavior is characterized by adaptability.

The human organism is capable of making an infinite variety of adjustments to his environment. For example, through the learning process the individual not only becomes acquainted with his world but is enabled to adjust to it according to his own unique patterns.

In attempting to avoid or relieve anxiety, the individual may adopt certain modes of response known as defense mechanisms, e.g., repression, projection, substitution, etc. Although useful, defense mechanisms may decrease contact with reality and thus lead to a breakdown in communications and strained interpersonal relations.

The method of adaptation will depend on past experience of the individual in relation to his environment.

Interpersonal relationships are enhanced through an understanding of the factors underlying behavior including behavior of self and others.

Understanding the behavior of others leads to increased objectivity in reacting to others.

With a more objective basis for interaction, anxiety is reduced.

As a result, arbitrary or judgmental reactions to another's behavior are minimized, and more satisfactory interpersonal relationships result.

Extensive research in the behavioral sciences has provided a basis for determining possible causes of certain behavior patterns.

Inroads are being made through research into isolating certain causal factors underlying human behavior.

In attempting to discover causal factors, a knowledge of conditions which frequently occur in conjunction with a given behavior pattern (e.g., aggression, withdrawal, truancy, etc.) is useful in guiding the observation and reflection as to causes.

Understanding behavior involves recognition that there are reasons underlying a given form of behavior.

A fundamental factor is the goal the individual is trying to achieve.

A further consideration relates to the choice of method used in achieving the goal.

Both sets of elements must be considered before an adequate understanding of behavior can be achieved.

Many physical disorders are caused or exaggerated by emotional conflicts.

A definite relationship has been demonstrated to exist between the occurrence of certain physical conditions (e.g., ulcers, colitis, dermatitis, asthma, migraine headaches) and the presence of emotional conflict.

Physical disability may produce profound personality changes.

Marked changes in self-concept, attitudes toward others, and behavior may result from physical disability or chronic disease.

From one-half to three-fourths of hospitalized mental patients leave the hospital improved or recovered.

Recovery rates for mental illness compare favorably with other serious illnesses.

Emotional well-being is based on the capacity to appraise one's self realistically, recognizing one's own strengths and weaknesses.

Self-acceptance becomes the foundation upon which an understanding of the behavior of others is built and thus effective interpersonal relationships are more likely to be achieved.

While group norms, standards, and values are products of human interaction and are developed in response to human needs, they in turn have a direct influence on the development of individual personality.

As a corollary, the significance of a given act or mode of behavior varies from one group, nation, or culture to another. What is considered abnormal in one culture may be accepted as normal in another.

Physical and mental disorders may be related.

Emotional disorders can be treated successfully in many cases.

Self-acceptance is fundamental to sound mental health.

Cultural and environmental factors have a considerable influence upon the development of personality and behavior.

NUTRITION

With the varied and abundant food supply in the United States, good nutrition is largely a matter of food selection. Nutritionally poor diets in the United States, except in pocket areas, continue to be largely the result of ignorance or indifference rather than unavailability

of necessary food. Nutrition education, therefore, deals chiefly with patterns of food selection—evaluating them, helping to establish good patterns and to improve poor ones. The obligation goes far beyond correcting undesirable eating patterns. Perpetuating and strengthening good eating patterns wherever they exist is the greatest commitment of nutrition education. With reliable food patterns, some basic concepts, and a willingness to eat a variety of foods, it should not be difficult for people to develop good food habits without seriously altering cultural and regional preferences.

Nutrition is the food you eat and how the body uses it.

We eat food to live, to grow, to keep healthy and well, and to get energy for work and play.

Food is made up of different nutrients needed for growth and health.

All nutrients needed by the body are available through food.

Many kinds and combinations of food can lead to a well-balanced diet.

No food, by itself, has all the nutrients needed for full growth and health.

Each nutrient has specific uses in the body.

Most nutrients do their work in the body when teamed with other nutrients.

All persons, throughout life, have need for the same nutrients, but in varying amounts.

The amounts of nutrients needed are influenced by age, sex, size, activity, and state of health.

Suggestions for the kinds and amounts of food needed are made by trained scientists.

The way food is handled influences the amount of nutrients in food, its safety, appearance, and taste.

Handling means everything that happens to food while it is being grown, processed, stored, and prepared for eating.

SMOKING

The use of tobacco, especially cigarettes, has been causally linked with lung cancer. It has further been related to coronary artery disease, chronic bronchitis, and emphysema. The potential hazard is great because these diseases are major causes of death and disability in the United States.

Nearly 70 million people in the United States consume tobacco regularly. The 1955 Current Population Survey showed that 68 percent of the male population and 32.4 percent of the female population 18 years of age and over were regular smokers of cigarettes. In general, the greater the number of cigarettes smoked daily, the higher the death rate. The mortality ratio for male cigarette smokers is 1.68 per thousand, representing a total death rate nearly 70 percent higher than for nonsmokers. Cigarette consumption per person (15 years of age and older) was 3,986 in 1961. Twenty-nine percent of teenagers (13-18 years of age) smoke.

The risk of development of lung cancer is directly related to the number of cigarettes smoked daily. Only about 10 percent of all lung cancer patients are nonsmokers. For those smoking less than half a pack of cigarettes a day, the death rate from lung cancer is seven times as great as for nonsmokers; for smokers of two packs or more a day, the death rate is 20 times as great.

The death rate for cancer of the lung has increased 10 times over that of 30 years ago. Death occurs usually during the peak years of earning and family responsibilities. In addition, lung cancer is striking at increasingly earlier ages.

Stopping cigarette smoking, even after long exposure, decreases but does not erase the risk of lung cancer and other physical disorders.

The risk of developing cancer of the lung for the combined group of pipe and cigar smokers is much less than for cigarette smokers, but more than for nonsmokers.

By the time active symptoms of lung cancer appear, the disease is far advanced.

The evidence linking cigarette smoking and lung cancer is very substantial.

Certain diseases other than lung cancer are found more commonly among cigarette smokers than nonsmokers: coronary artery disease, pulmonary emphysema, chronic bronchitis, and stomach ulcers.

The habitual use of tobacco is related to psychological and social drives and is strengthened and made continuous by the drug effects of nicotine on the body and specifically on the central nervous system. The habit is increasingly more difficult to break as it becomes more established.

Cigarette smoking is an expensive as well as a dangerous habit.

Treatment consists of removal of all or part of the affected lung. Chances for cure are about 1 in 20.

The American Public Health Association states that one million school age persons today are expected to die of lung cancer before they reach the age of 70.

The tar residue of inhaled smoke irritates and stimulates coughing which becomes chronic and persistent.

Physiological changes take place in the body when a person smokes:

- The heart rate and blood pressure are increased.
- The respiration rate is increased.
- Surface arteries constrict, and there is a drop in the temperature of the body.

Cigarette smoke weakens, paralyzes, and may finally destroy the cilia of the lungs.

Cigarette smoking is the most important of the causes of chronic bronchitis in the United States, and it increases the risk of dying from chronic bronchitis.

Male cigarette smokers have a higher death rate from coronary disease than nonsmoking males.

- Nearly half of the middle-aged and elderly males in the United States are cigarette smokers, and about half of them will die of coronary disease.
- Cigarette smokers have been found in several studies to have 1.7 times as high a coronary death rate as nonsmokers.

People usually claim different reasons for smoking: the habit gives them pleasure, helps them concentrate, relaxes them, and helps them feel more at ease in social situations. Smoking appears to be not just one behavior, but a range of diverse psychological behaviors, each of which may be set off by different personal needs. There is no single explanation for smoking behavior.

Dropping the smoking habit once it is established is harder than giving up other learned habits, partly because nicotine, a constituent in tobacco, has an addicting quality.

Smoking a pack every day for a year costs a person approximately \$100.

Americans spend more than \$7 billion yearly on tobacco products.

No method of treating tobacco or filtering the smoke has been demonstrated to be effective in materially reducing or eliminating the hazards of lung cancer. No cigarette smoke is completely free from nicotine.

The cigarette industry spends \$140 million annually on television advertising.

The ability to produce maximum effort and to build endurance for sports is related to the capacity of the athlete to take in and utilize oxygen. Cigarette smoking interferes with this capacity.

A study of pregnant women in Baltimore indicated a higher rate of premature births among smokers than among nonsmokers.

Women who smoke during pregnancy also tend to have babies of lower birth weight than nonsmokers of the same economic class.

Forest fires caused by careless smoking habits result in incalculable loss of timber, wildlife, and recreation areas.

Every year many persons die as a result of falling asleep while smoking.

Cigarette advertising is not always accurate and is often misleading.

Smoking may interfere with physical activities.

Scientific evidence indicates that maternal smoking has an unfavorable effect on unborn infants.

Smoking is the greatest single cause of fires. It results in more than 100,000 fires each year.

III THE CONCEPTUAL APPROACH— A STIMULUS TO ACTION

The health areas we have presented in the preceding chapter are by no means all-inclusive. There are many other areas which need to be explored in depth. But what has been presented will be of value only if put to use in the development of vital programs of health education for young people.

These materials can be used creatively:

- By curriculum planners and innovators in the development of health education programs.
- By the teacher in the classroom as a guideline in the selection and development of experiences which will assist pupils to discover health concepts for themselves in ever-increasing levels of sophistication.
- By the school administrator as a basis for evaluating and improving the school health education program as it is now being taught.
- By teacher preparation institutions as one means of assessing the timeliness of pre-service education programs.
- By medical schools to acquaint the doctors of the future (especially the pediatrician and public health personnel) as to the current thinking and scope of health education.
- By the school nurse, as she works with the teacher in selecting appropriate materials, and as she works in the community in arousing interest in the school health program.
- By the PTA health chairman, as he plans for health education in the PTA action program for the year.

- By youth-serving agencies, as they work in their own way with young people in helping them develop sound health attitudes.

- By personnel having close contact with young people—guidance counselors, school social service workers, the school psychologist—in implementing sound health education in very personalized and individualized ways.

Concepts become clearer as students are given opportunities:

- To study health problems that directly affect them.

- To assess their own values and the values of others in health areas.

- To develop and apply evaluative attitudes toward the advertising of health services and products and to acquire the ability to recognize quackery.

- To develop a sense of responsibility for personal, family and community health.

Thus, health education becomes an *applied* science, concerned with man's understanding of himself in relation to health matters in a changing world. Health concepts apply to living. The challenge, then, is to provide sound health education for all young people.

APPENDIX

Resource Personnel

In some health areas, authoritative written sources were used as reference material. However, the following people were personally contacted by the Commission on Curriculum Development and helped formulate the material presented in this book:

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